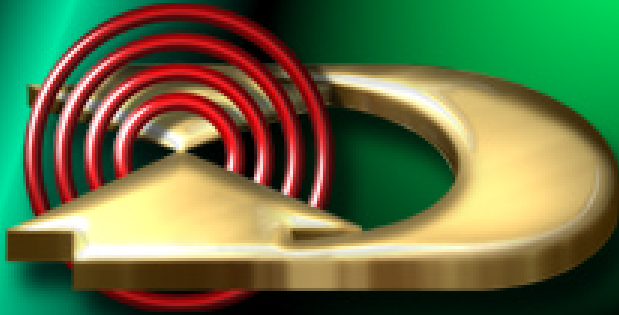


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Emerging Ideas

Relating EVM to “Real” Schedules

Wayne Abba

Dekker, Ltd.



Old Concepts - New Ideas

- Schedule variance
 - ♦ What it is
 - ♦ Strengths
 - ♦ Weaknesses (misunderstandings?)
 - ♦ Unleashing the power of schedule information
 - ♦ Reconciling earned value schedule and “real” schedule
- Cost variance
- Risk management
- Management reporting and presentation



Schedule Variance

- Definition
 - ♦ Earned Value (BCWP) minus Planned Value (BCWS)
- Positive (+) variance indicates volume of work performed ahead of plan
- Negative (-) variance indicates volume of work performed behind plan



Schedule Variance Example

- Planned value: 50
- Earned value: 40
- Actual cost: 35
 - ♦ Schedule variance = $40 - 50 = (10)$
 - ♦ Schedule variance percent = $10/50 = 20\%$
 - ♦ Schedule performance index = $40/50 = .8$
- What does this tell us?
 - ♦ Behind schedule?
 - ♦ What? By how much?



The Maligned Metric

- “Schedule” Variance
 - ♦ Doesn’t measure time
 - ♦ Doesn’t reveal if the right work was done
 - ♦ A positive variance is not necessarily good
 - ♦ A negative variance is not necessarily bad
 - ♦ What good is it?
- Sound and fury...





Discussion

- Issue
 - ♦ Doesn't measure time
 - ♦ Doesn't identify work
 - ♦ "+" may be bad
 - ♦ "-" may be good
- Reason
 - ♦ Measures value of work completed vs. planned on same basis (\$, hrs.)
 - ♦ Requires 'drill down' analysis
 - ♦ Work done not on critical path; offsetting variances masked
 - ♦ Float



Schedule Variance: Strengths

- Provides reliable early warning
 - ♦ When large, early and unfavorable
 - ♦ Observations on 100's of DoD contracts
- Reflects cost/schedule integration
 - ♦ Work breakdown structure
 - ♦ Performance measurement baseline

There is no cost variance but there is a large negative schedule variance





Schedule Variance: Misunderstandings

- Earned value technique was developed for cost measurement, not scheduling
 - ♦ Three basic elements
 - ♦ Planned value
 - ♦ Earned value
 - ♦ Actual cost
 - } Data needed to obtain
 - } ***Objective cost measurement***
- Earned value measures work accomplished
 - ♦ Better term “accomplishment variance?”
 - ♦ Must be used with other schedule information



The Time is Right for Change



- Better environment
 - ♦ Earned value redefined from reporting to management
- Better tools
 - ♦ Relational data bases
 - ♦ True cost/schedule integration - earned value & critical path
 - ♦ Timely data (weekly earned value becoming common)



Unleashing the Power

- By itself, schedule variance reveals no intelligence about critical path
 - ♦ How are cost and schedule integrated?
 - ♦ Planned value at early start creates earliest possible variance information
 - ♦ But also creates “meaningless” schedule variance
 - ♦ Later integration creates less negative variance and correspondingly less management information
 - ♦ There is no industry standard
 - ♦ DEKKER TRAKKER™ uses early start date



Unleashing the Power

- Solution
 - ♦ Take advantage of earliest practical information
 - ♦ BCWS at early start
 - ♦ A later date cannot optimize management information
 - ♦ Use data base engine capabilities
 - ♦ Integrate schedule and earned value information
 - ♦ Part of management process
 - ♦ “Report up,” not “drill down”
 - ♦ Create new schedule variance subcategories



Schedule Variance Categories

- “Problem”
 - ♦ Critical tasks that did not start early
- “Late with Float”
 - ♦ Tasks that did not start early but are not critical
- “Purposely Delayed”
 - ♦ Tasks delayed due to work-around (user flag)
- “Early”
 - ♦ Tasks begun ahead of early start
- “Anomalies/Errors” (user flag)



Schedule Variance Example

- Schedule variance $40 - 50 = (10)$

Problem - 2 *

Late with float - 6 *

Purposely delayed - 4

Early + 2 *
- 10

**tracked automatically*



Cost Variance

- Definition
 - ♦ Earned Value (BCWP) minus Actual Cost (ACWP)
- Positive (+) variance indicates underrun for work completed to date and work in process
- Negative (-) variance indicates overrun for work completed to date and work in process



Cost Variance Categories

- Similar to Schedule Variance
 - ♦ Understood & accepted
- Subcategories
 - ♦ “Positive”
 - ♦ “Negative”
 - ♦ “Anomalies/Errors”
- Avoid “washout” of lower level variances

±\$



Cost Variance Example

- Cost variance $40 - 35 = 5$

<i>Negative</i>	- 5 *
<i>Positive</i>	<u>+ 10 *</u>
	5

**tracked automatically*



Risk Management

- Better risk identification - work in process
- “Watch List”
 - ♦ Prospective analysis to identify tasks that will affect critical path if not begun on schedule
 - ♦ 30/60/90 day
 - ♦ Relate to risk management
- Management vs. reporting
 - ♦ Data base engine is key
 - ♦ Extract intelligence from data to create meaningful management outputs



Management Presentation

- Customer understanding
 - ♦ Integrated Baseline Review
 - ♦ External customers
- Customer reports
 - ♦ Categorize variances
 - ♦ Management charts
 - ♦ Lines/colors
 - ♦ Web delivery
 - ♦ Problem notification by e-mail





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CLASSIFICATION

REPORT VALUES FACTORED BY: 1

PAGE 1

Cost Performance Report - CPR - Form																	
CONTRACTOR: Acme Widgets LOCATION: 123 South Sunset Road Taos, New Mexico RDT&E: PRODUCTION:						CONTRACT TYPE/NO: C6 A7894324		PROGRAM NAME/NUMBER IMPLA904 Widget		REPORT PERIOD 07/31/1999		SIGNATURE, TITLE & DATE		FORM APPROVED OMB NUMBER 22R0200			
QUANTITY 500.00		NEGOTIATED COST \$526,954		EST COST AUTH, UNPRICED WORK \$150,000		TGT PROFIT/FEE % 11%		TGT PRICE \$1,245		ESTIMATED PRICE \$1,145		SHARE RATIO 1 : 1		CONTRACT CEILING \$600,000		EST CONTRACT CEILING \$625,000	
ITEM	CURRENT PERIOD						CUMULATIVE TO DATE						REPRO-GRAMMING ADJUSTMENTS		AT COMPLETION		
	BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE		BUDGETED COST		ACTUAL COST WORK PERFORMED	VARIANCE		COST VARIANCE	BUDGET	BUDGETED	LATEST REVISED ESTIMATE	VARIANCE		
	WORK SCHEDULED	WORK PERFORMED		SCHEDULE	COST	WORK SCHEDULED	WORK PERFORMED		SCHEDULE	COST							
2100 Product Development	\$33,546	\$85,234	\$16,400	\$51,688	\$68,834	\$139,204	\$139,760	\$68,300	\$496	\$71,460			\$149,600	\$78,050	\$73,550		
2110 Applications		\$1,436	\$1,200	\$1,436	\$236		\$1,436	\$7,050	\$1,436	\$5,614				\$7,770	\$-7,770		
2120 Applications	\$63,968		\$68,850	\$-63,968	\$-68,850	\$223,022	\$103,410	\$254,390	\$-110,612	\$-150,980			\$249,200	\$450,978	\$-201,776		
2130 Technical Writing	\$12,100	\$11,675	\$12,000	\$-425	\$-325	\$17,050	\$15,950	\$16,600	\$-1,100	\$-650			\$22,000	\$22,650	\$-650		
2132 Implementation		\$741	\$400	\$741	\$341		\$741	\$2,000	\$741	\$-1,259				\$2,384	\$-2,384		
3100 Customer Support		\$463	\$800	\$463	\$-337		\$463	\$2,800	\$463	\$-2,337				\$3,040	\$-3,040		
4100 Technical Services	\$4,940	\$5,510	\$4,750	\$570	\$760	\$9,500	\$9,500	\$9,500					\$9,500	\$9,500			
4120 Data Communications		\$139	\$150	\$139	\$-11		\$139	\$600	\$139	\$-461				\$672	\$-672		
5100 Education	\$420	\$1,119	\$1,170	\$809	\$-51	\$1,680	\$2,347	\$2,705	\$687	\$-358			\$4,169	\$5,084	\$-1,515		
5120 Customer Training		\$246	\$400	\$246	\$-154		\$246	\$1,000	\$246	\$-754				\$2,502	\$-2,502		
6100 Quality Assurance		\$452	\$280	\$452	\$172		\$452	\$1,120	\$452	\$-668				\$1,813	\$-1,813		
6110 Systems QA		\$185	\$200	\$185	\$-15		\$185	\$800	\$185	\$-615				\$896	\$-896		
6120 Applications QA		\$185	\$200	\$185	\$-15		\$185	\$800	\$185	\$-615				\$896	\$-896		
Subtotal:	\$114,974	\$107,385	\$108,800	\$-7,588	\$685	\$390,496	\$274,814	\$397,665	\$-115,882	\$-92,851			\$434,469	\$584,833	\$-150,364		
Labor Overhead	\$5,359	\$7,747	\$6,812	\$2,388	\$935	\$25,873	\$22,037	\$42,578	\$-3,836	\$-20,541			\$28,152	\$60,089	\$-31,937		
G&A	\$8,081	\$7,931	\$7,940	\$-150	\$-9	\$27,961	\$19,022	\$30,248	\$-8,930	\$-11,226			\$31,028	\$45,119	\$-15,091		
Subtotal:	\$133,440	\$155,678	\$144,752	\$2,238	\$926	\$53,834	\$41,059						\$59,180	\$106,208	\$-47,028		
<div>DoD Cost Performance Report</div>																	

DoD Cost Performance Report



Project: IMPLA904	CPR 5-Variance Analysis	Run Date: 04/10/1999
Report Name: 07PRF7VAR	WBS 1.4 Software Develop	Run Time: 09:23
Planned By: David Lamont		Status Date: 07/31/1999
		Form: RES0210

Project Title Master Implementation of ABC/EVMS	Project - WBS Number 1.4
Cost Account Title 1.4	Cost Account Manager

Current Period					Cumulative-To-Date				
BCWS	BCWP	ACWP	Sched Var	Cost Var	BCWS	BCWP	ACWP	Sched Var	Cost Var
\$33,546	\$98,058	\$18,750			\$139,263	\$142,584	\$75,500	\$3,321	
								2.35%	

Thresholds					At Completion		
Current Period		Cumulative-To-Date		At Completion	BAC	EAC	VAC
SV: + 10%	CV: + 10%	SV: + 10%	CV: + 10%	VAR: + 10%	\$149,600	\$87,714	
- 10%	- 10%	- 10%	- 10%	- 10%			
OR \$10000	OR \$10000	OR \$10000	OR \$10000	OR \$10000			

<p>Cause</p> <div style="border: 2px solid green; border-radius: 50%; padding: 20px; text-align: center; margin: 20px auto; width: 80%;"> <p>Schedule Variance Categories</p> <p>Problem</p> <p>Late with float</p> <p>Delayed</p> </div>



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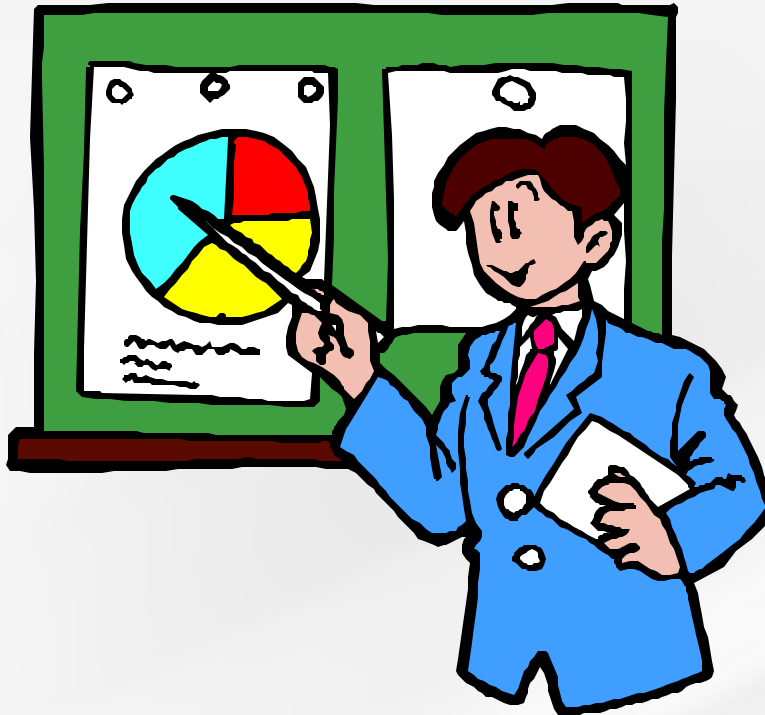
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- 10%	- 10%	- 10%	- 10%	- 10%			
OR \$10000	OR \$10000	OR \$10000	OR \$10000	OR \$10000			

<p>Cause</p> <div style="border: 2px solid green; border-radius: 50%; padding: 20px; text-align: center; margin: 20px auto; width: 80%;"> <p>Cost Variance Categories</p> <p>Positive</p> <p>Negative</p> </div>
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Management Charts



- Refine current designs
 - ♦ Cost/schedule variance trends
 - ♦ More than one schedule variance line
- New types
 - ♦ Pie chart
- Web-based presentation
- Automatic e-mail notices



Coming Attractions

- Display overtarget baselines clearly
- Display relationship between cost variance and financial status (for example, share lines)



Summary

- State of the art in cost/schedule integration
 - ♦ Made possible by state of the art software
- Better integration of earned value and risk management
- Powerful management information outputs
- Raising the bar for integrated project management tools